Volunteer Firemen

Professional Journal of the Volunteer Firemen's Section of the National Fire Protection Association

Volume 1, Number 10 **BOSTON, MASSACHUSETTS** **July, 1934**

The State Normal School at Bridgewater, Mass., was destroyed with a loss of $1,000,000 and danger to the lives of 300 sleeping girl students because the town did not have an adequate water system and state authorities had not seen fit to act on the condition. Only one fire stream could be obtained.

Planning Town Water Systems

They Must Be Designed to Bring Right Amounts of Water to Places Where the Fire Department Needs It

By Clarence Goldsmith
(Member N.F.P.A.)

Assistant Chief Engineer, National Board of Fire Underwriters Chicago

THE amount of water and the rate at which it must be supplied by the water system of any community are determined primarily by the needs of the fire department and other fire protection. The smaller the town, the truer this is, so that the problem as it presents itself to a community of 2,000 population or less has been selected to illustrate the principles involved in the design of the water system.

The actual design and installation of a water works system are generally carried out by consulting engineers before being turned over to the town authorities for operation, but since the rates at which water must be provided for domestic and manufacturing uses are usually much less than the needs for fire protection, it is up to the fire department officials to see that the amount of water to be provided, the location of hydrants, and

Extensive damage was done to this dwelling because volunteer firemen could obtain but one effective fire stream from a near-by hydrant. An attempt to use two streams made both ineffective.

the pipe sizes used are such as to provide adequately for the needs of the fire department.

Number of Streams

Most of the buildings in a town of 2,000 or less will be dwellings of low heights. Two fire streams (or approximately 500 gallons of water per minute) will satisfactorily take care of such districts. Where the buildings are closer together, so close as to make it likely that fire in one will spread to the others (50 feet or less apart), two additional fire streams should be available in order to penetrate the fire in the burning building and to wet down the exposed buildings.

In talking about hose streams we have in mind standard fire department hose streams with nozzles $1\frac{1}{8}$ to $1\frac{1}{4}$ inches in diameter and nozzle pressures of from 30 to 40 pounds. Such streams provide an effective horizontal or vertical reach of about 60 feet. It therefore appears reasonable to figure that towns having populations of 2,000 or less should have four or more fire streams of 250 to 300 gallons per minute available, which makes a minimum requirement for fire protection of from 1,000 to 1,500 gallons of water per minute.

Friction loss in fire hose is one of the greatest limiting features in fire fighting and, together with the number of streams required, determines the location and spacing of hydrants. Obviously, where four fire streams are supplied for any group of buildings, there must be at least two hydrants available to which to connect.

Locating Hydrants

Fire departments know that hose lines more than 400 or 500 feet long are difficult to handle, and therefore the hydrants should be spaced not more than 300 or 400 feet from the buildings to be protected. The above figures are based on the assumption that the fire department will use pumping engines at the hydrants. Where it is the fire department practice to use direct hose streams from hydrants, pressures available are seldom over 100 pounds. Under these conditions, hose lines must be kept about 100 feet shorter to prevent undue friction losses, which means that hydrants must also be at least 100 feet closer to the buildings to be protected. In locating hydrants, it is generally satisfactory to place one hydrant at each street intersection and to set intermediate hydrants where the distance between intersections exceeds 350 to 400 feet.

Layout of System

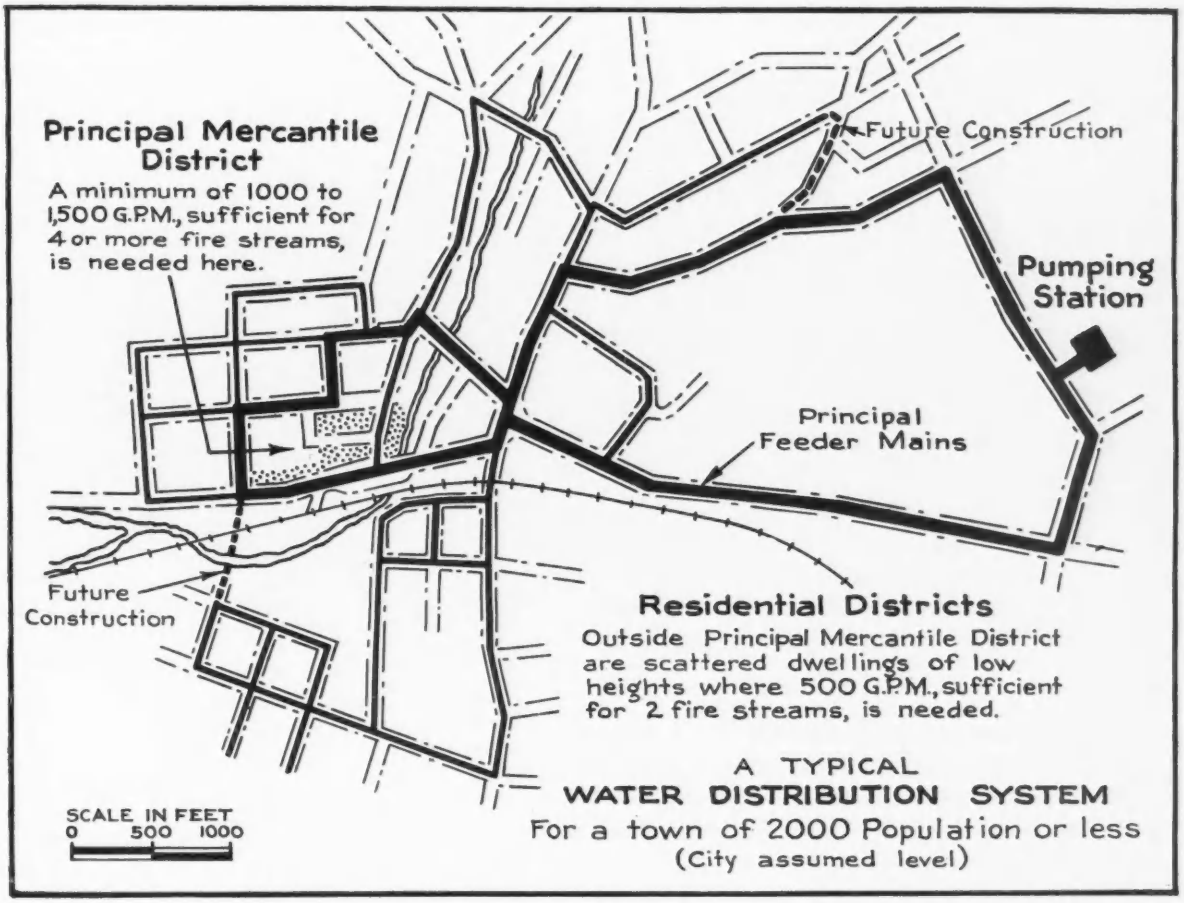
The choice of a source of water supply will largely depend on local conditions, but in any case it will have an important bearing on the design of the distribution system. The principal feeder mains serving the central section of the town should enter from at least two sides in order to utilize their full capacity and to prevent the entire water supply in the central section being cut off in case of an accident to one line or the other. The accompanying diagram illustrates how this has been accomplished in a typical instance. The ideal layout is to have a pumping station on one side of the town and an elevated storage tank or reservoir on the other, provided that the topography permits such an arrangement. The standpipe storage is not provided to take care of fires which last very long, but it permits the shutting down of the pumps during the night. In a small plant this is a decided advantage from the operating viewpoint, as the storage will furnish the water for the fire for the short period required to get the pumping equipment into service.

Pressures

After solving the problems of source of supply, the matter of pressures must be considered. Effective fire streams require that pressures be maintained at the time of fire flow at about 60 pounds at the hydrant. If fire engines are used, this pressure may be as low as 20 pounds.

Principal Feeder Mains

In designing a water works system it is necessary to prepare a map showing the streets, buildings, hydrants and mains. The first step is to locate the hydrants in accordance with the principles outlined above. A study of the street arrangement will reveal the


Principal Mercantile District
A minimum of 1000 to 1,500 G.P.M., sufficient for 4 or more fire streams, is needed here.
Future Construction
Pumping Station
Principal Feeder Mains
Future Construction
Residential Districts
Outside Principal Mercantile District are scattered dwellings of low heights where 500 G.P.M., sufficient for 2 fire streams, is needed.
SCALE IN FEET
0 500 1000
A TYPICAL
WATER DISTRIBUTION SYSTEM
For a town of 2000 Population or less
(City assumed level)

most direct routes which the principal feeder mains should take from the supply works to the point of greatest demand, which is usually the principal mercantile district. After locating the principal feeder mains, the best method of connecting them and tying them into a network should be considered. Mains into the various sections should be looped, as these have far more capacity when the supply can come from two directions than if the pipes are dead ends. Four-inch mains are too small for fire service. Six-inch pipe, when looped, or forming a part of a gridiron system, provides good fire protection. Because of the necessity for making repairs, the fire protection can be made more reliable by laying two or more lines in preference to a single line of equal carrying capacity.

The Advantage of Large Feeder Mains

There is a decided advantage in having the principal feeder mains for a water distribution system as large as practicable. The following table, based on conditions illustrated by the above map, shows how much more efficient the larger size mains are. Small mains mean high friction losses, which, in turn, mean that the pumps at the pumping station must either do a lot of extra work or the fire department doesn't get pressure enough from the system to work with.

PRESSURES AT PUMPING STATION
Required to give the following quantities of water at 20 pounds pressure in the Principal Mercantile District.

Principal Feeder Mains	1500 G.P.M.	2000 G.P.M.	2500 G.P.M.
6 in.	235	—	—
8 in.	73	110	155
10 in.	38	51	67
12 in.	28	33	40

The accompanying table shows the advantage of providing large mains. It may not be economical to lay mains of a sufficient capacity for the probable demands twenty years hence, but any pipes which are now laid should be so routed and of such capacity as to care for the present needs and to lend themselves to incorporation in a system which might be required twenty years hence.

Needless to say, the fire department should have complete information about the system after it is installed conveniently available for frequent reference. A practical method of doing this is to have a map of the water distribution system showing location of hydrants (and if possible buildings as well), posted at the headquarters of each fire company where the men assemble.

Pressures to Produce Best Fire Streams

Pressures Required at Hydrant or Fire Engine to Produce Best Streams, Using Various Size Nozzles and Hose Lengths

PRESSURES IN POUNDS PER SQUARE INCH
Table Prepared from Tests at North Carolina Fire College and Drill School
Sherwood Brockwell, J.L.Croom, and J.C.Fitzgerald, Fire College Committee
NORTH CAROLINA FIREMENS ASSOCIATION

Size of Nozzle	Nozzle Pressure (Pitot) Pounds	Discharge Gallons per Minute	Single 2½in. Hose Line Feet of Hose										Single 3in. Line Feet of Hose				Two 2½in. Lines Feet of Hose		
			100	200	300	400	500	600	700	800	1,000	1,200	800	1,000	1,200	1,500	1,000	1,500	2,000
1 in.	45	198	56	66	76	86	96	106	115	125	145	165	77	84	92	103	72	86	99
1⅛in.	50	265	69	86	103	120	137	154	171	188	222	256	104	117	130	150	98	121	144
1¼in.	50	326	78	103	128	153	178	203	228	253	303		130	149	168	197	121	155	189

For every 2ft. of vertical lift add 1 pound (For every story of building add 6 pounds)

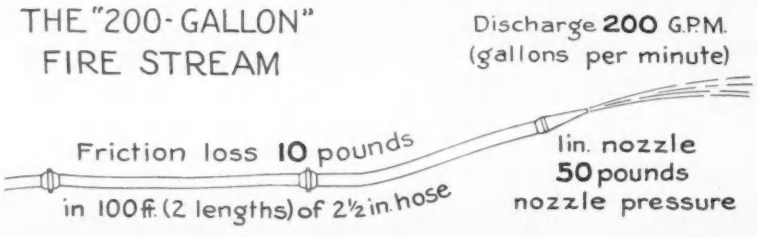
FRICTION losses in a 2½-inch hose line when getting a discharge of 200 gallons per minute from a 1-inch nozzle at 50 pounds pressure amount to approximately 10 pounds. This has been referred to previously as a simple figure for fire officers to remember at fires when making rough mental calculations as to what hose layouts will work. The reliability of this figure of 10 pounds is borne out by the above table, which shows the results of actual tests made by the Fire College Committee of the North Carolina Firemen's Association. The table gives the pressures required at the hydrant or fire engine to produce the best streams and using 1-inch, 1⅛-inch, and 1¼-inch nozzles with various lengths of hose lines. It is a useful set of figures which covers most of the hose layouts which the fire department is ordinarily called upon to use.

The table shows the relative friction loss for the different lengths of 2½-inch hose lines of 10 pounds per 100 feet for the 1-inch nozzle, 17 pounds for the 1½-inch, and 25 pounds for the 1¼-inch nozzle. As the single 2½-inch hose line discharging about 200 gallons per minute through a 1-inch nozzle at about 50 pounds nozzle pressure is a size commonly used by volunteer fire departments, only the first of these three figures need be remembered. These pressures are for hose lying horizontally; one pound should be added to them for each two feet of vertical lift.

Some fire departments are carrying a supply of 3-inch hose for use where the fire is some distance from the water supply and where long lays are necessary. The tests prove by comparison the advantages of the larger hose for this use. For example, assuming a 1-inch nozzle discharging around 200 G.P.M., the pressure for 800 feet of 2½-inch line needs to be 125 pounds, and for 800 feet of 3-inch line it need be only 77 pounds—or about 60 per cent of the 2½-inch line pressure to obtain the same discharge. With this discharge, the friction loss in the 3-inch line is only about 4 pounds per 100 feet as compared to 10 pounds for a 2½-inch line.

Figures are also given for two 2½-inch hose lines. Taking a 1,000-foot line, we make the following comparison. The two 2½-inch lines require 72 pounds pressure, which is one-half that for a single 2½-inch line; while a single line of 3-inch hose requires only 84 pounds, or slightly more than that for two 2½-inch lines. Considerably more work is required to lay two 2½-inch hose lines than to lay one 3-inch line. Some departments prefer to lay two lines of 2½-inch hose rather than have to make special provisions for carrying 3-inch hose. A few lengths of 3-inch hose are often useful, however.

Men assigned to pumpers will find this table useful. Some departments put such data in a frame under glass attached to the side of the pumper, where it can be referred to by the operator.



The Electricity in a Cat's Back

Study of Static Electricity in Industrial Plants as Cause of Fires—Human "Sparkers"

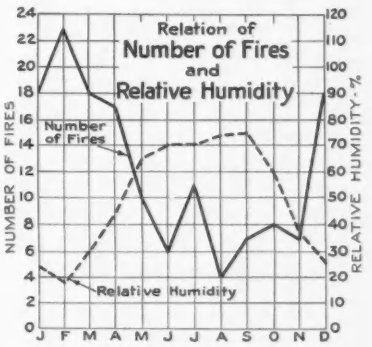
AN investigation made by E. E. Turkington (Member N.F.P.A.) reveals that static electricity causes numerous fires and explosions, some of them of a very freakish nature. These static charges are built up when a cat's back is stroked with the hand, or when a belt runs over pulleys which run machinery, and in thousands of other ways where there is repeated contact and separation of two unlike substances. In his paper, read before the annual convention of the National Fire Protection Association at Atlantic City in May, Mr. Turkington related typical instances where these little static sparks endangered life and property.

While two painters were using paint remover in a closed room, a static spark jumped from one of their hands and ignited the mixture of paint-remover vapor and air. The rapid combustion of the mixture increased the pressure in the room so that the men could not open the door, which opened inward. However, the building was sprinklered and two sprinkler heads operated and cooled the gas, and the men escaped.

A woman fed leather shoe soles into a machine which coated them with rubber cement, and on five different occasions a spark from her fingers ignited the gasoline vapors from the cement. After one of the fires, in which she was severely burned, she was under medical care for three weeks, and during her absence another girl operated the machine without a single fire. When the first operator returned she had been at work only fifteen minutes when the cement was ignited again. She was assigned to other work and there were no more fires at this machine.

As a paymaster was handing a pay envelope to the operator of a machine giving off flammable vapors, a static electric spark jumped from his fingers and caused a fire.

Static charges do no harm in most ordinary cases because they travel to the ground and are neutralized before they become large enough to be dangerous. But when charges collect on materials which are not good conductors of electricity, such as the human body or belts driving machinery (as high as 75,000 volts have been found on belts), they often become strong enough to jump to a near-by metal object. In doing this, gasoline or rubber-cement vapor, dust or other flammable substances close by may be ignited and cause a fire or explosion.


Relation of
Number of Fires
and
Relative Humidity
Number of Fires
Relative Humidity
NUMBER OF FIRES
RELATIVE HUMIDITY-%
0 2 4 6 8 10 12 14 16 18 20 22 24
0 10 20 30 40 50 60 70 80 90 100 110 120
J F M A M J J A S O N D

Dangerous amounts of static charges on belts may be prevented by having grounded metal combs rub on the belt near the places where it leaves the two pulleys. When charges build up on people because of clothes rubbing on each other, rubbing of shoe soles on rugs, or because of the machine or materials they work with, a method of grounding these people should be employed if they work near flammable vapors or dusts. (People with dry skins accumulate static electricity more rapidly than those with moist skins.) In some cases this may be done by grounding the metal tops of tables or metal floor-plates on which workers operate. In very hazardous places workers may wear shoes with fine copper or brass wires or nails through the soles to conduct the charges to the ground.

The fire record due to static bears out what is well known, that the greater amount of moisture in the air, the less the chance for dangerous static sparks. Actual records of fires caused by static electricity illustrated in the accompanying chart show that more fires occur in the winter months, when artificial heating is required and the humidity indoors is low. So artificial humidifying of the air is a means of preventing fires in all industrial operations where static sparks might otherwise cause disastrous fires and explosions.

Courtesy *Factory Mutual Record.*

The disastrous effects of a gasoline-vapor explosion. Presumably set off by a static spark, this detached building of a rubber processing plant was completely wrecked.

Electric Lights and Gasoline Vapor

How Dangerous Are Incandescent Lamps On Pumps for Dispensing Gasoline?

THERE seems to be a controversy as to whether electric lamps which are used on or in the pedestal of a gasoline dispensing device for illuminating the advertising globe or meter dials are likely to ignite gasoline vapor. The question appears to be whether these lamps are in an "explosive atmosphere," — what the National Electrical Code under its classification of hazardous situations calls a "Class I location." In such locations "explosion proof" lighting fixtures are required. The common "vapor proof" fixture does not meet this requirement. It isn't "explosion proof." The two terms are not synonymous.

Is the top of a gasoline dispensing pump housing a Class I situation?

Lamps Inside Pump Housings

All over the country thousands of these pumps are found with both unenclosed lamps and globe enclosed lamps, and statistics on their behavior are very meager. Can any readers report cases of vapor-ignition by these lamps? Naturally it is the lamps installed inside the housing that might be considered the most hazardous. In some pumps, openings in the housings are provided for the insertion of hose nozzles, and any liquid that drips from these nozzles may fall inside the housing, creating an explosive atmosphere unless the bottom is well supplied with vent openings. The normal heating of a lamp might not be so much an item of concern as the possible loosening of it in its socket occurring from vibration, resulting in arcing and sparking at the contacts. It is with the thought of avoiding ignition of such vapors as might come in contact with lamps located within pedestal housings that use has been made of the "vapor-proof" lighting fixtures. In some cases such enclosed fixtures have been required by local regulatory bodies to be used even in advertising globes located at the topmost point of these assemblies, where it may be expected gasoline vapors seldom if ever accumulate.

Fixtures of conventional design employ gaskets and other constructions which cannot be depended upon to exclude vapors, as they are not intended to be vapor-tight. Irrespective of the condition in which these asemblies may leave the factory, they do not remain vapor-tight. The breathing action, induced by temperature variations due to alternate periods of heating and cooling when the lamp is in use and when it is not, may reasonably be expected to result in vapors, if present, being drawn into the protecting enclosure. Thus it may be agreed that with the possible exception of the additional mechanical protection afforded by the outer globe, these fixtures offer little if any advantage over unenclosed lamps in the matter of avoiding ignition of vapors if such be present.

No data are available to indicate that the use of so-called vapor-proof lamps has improved conditions or in any measure resulted in a reduction of loss by fire or explosion. We are accordingly confronted with the fact that although thousands of discharge devices provided with unenclosed electric lights are in use today, the experience with them has not been such as clearly to demonstrate that the interior of the discharge device pedestal should be considered as distinctly a Class I location.

Gasoline Pump Fires

Fires and explosions which have occurred in gasoline discharge devices have been reported as igniting at switches or caused by defective or improper wiring so frequently found at installations of these equipments. Since general use has been made of switches, outlet, and junction boxes of proper type, and since provision has been made to isolate switch arcs by the proper use of sealing materials, the number of reports of fires occurring in these equipments has been greatly reduced. The intensity of the arc formed at switch contacts when opening or closing a power circuit is no doubt much greater than that of the small sparks and the arcing which may be caused by a loose lamp. It is also a fact that motor control switches are usually installed at a low level in pedestals, where flammable vapors are likely to accumulate. On the other hand, lamps employed for illuminating meter dials and advertising globes are located at a much higher level and are in operation only at times when their loosening in holders should become readily apparent due to flickering of the light. They can be tightened easily.

What Is the Field Experience?

If all parts of the interiors of pedestal housings are judged to be or are demonstrated to be Class I locations, as defined by the National Electrical Code, only lighting fixtures which are acceptable for use in explosive atmospheres should be permitted in these locations. On the other hand, if general field experience has not borne out theoretical conclusions, it does not appear to be necessary to press the consideration of explosion-proof lighting fixtures for discharge devices at this time.

Readers can help materially in reaching a reasonable decision if they will send to the Editors of VOLUNTEER FIREMEN the complete story of any fires that in their experience have occurred in these gasoline dispensing devices, and particularly where the lamp or lighting fixture seems to have been a cause or factor.

6,000 Members

THE summer season has slightly slackened the astounding rate at which volunteer companies have been applying for membership in the Volunteer Firemen's Section of the National Fire Protection Association, but during the last month the section membership passed the six thousand mark. The following volunteer fire companies with 365 men have joined since the last issue of this magazine, making the total membership 6,015 to date.

Ojai Valley Fire Department, Ojai, California.

Mediapolis Fire Company, Mediapolis, Iowa.

Birmingham Fire Department, Birmingham, Michigan.

Alliance Volunteer Fire Department, Alliance, Nebraska.

Fairbury Fire Department, Fairbury, Nebraska.

Long Pine Volunteer Fire Department, Long Pine, Nebraska.

Schuyler Fire Department, Schuyler, Nebraska.

Sayville Fire Department, Sayville, New York.

Amherst Fire Department, Amherst, Ohio.

Warrensville Heights Fire Department, Warrensville Heights, Ohio.

Edge Hill Company No. 1, Edge Hill, Pennsylvania.

Lebanon County Firemen's Association, Palmyra, Pennsylvania.

Horicon Fire Department, Horicon, Wisconsin.

West Bend Fire Department, West Bend, Wisconsin.

St. Stephen Fire Department, St. Stephen, New Brunswick.

Kenora Fire Department, Kenora, Ontario.

Pyrene Prize Letter Contest

This Month's Awards for Best Letters on Fires Put Out With Fire Extinguishers

First Prize—$10.00

H. J. REIDENBACH, Chief,
Volunteer Fire Dept., Westport, N. Y.

Hand Extinguishers Save the Town

"A few years ago, our town had only a water pump with which to fight fire. A fire started in a large frame bakery building and was almost immediately out of control, spreading to the sides of another frame building across the railroad tracks. Volunteers tried to save the second building by pumping water on it from a near-by cistern, but the hose had so many holes in it that the pump was useless.

"The business men began bringing their extinguishers, which were mostly 2½-gallon soda-acid and similar types. Volunteers put on heavy coats, and, working from an outside stairway, put out the fires wherever the siding ignited. Our druggist stayed near and recharged the extinguishers as quickly as they were discharged.

"So, thanks to hand fire extinguishers, the main part of our town was saved."

Second Prize—$3.00

C. F. WEIR, Chief,
Fire Dept., Abbotsford, B. C., Can.

Saves 18 Motor Trucks

"In France during the war at an English Army Motor Park, 18 3-ton trucks were placed in a line along the side of the road to prepare them for replacements or reinforcements. It was a wet morning and a ditch under the trucks was filled with water. When filling the gasoline tanks, the drivers spilled some gasoline in this ditch.

"One driver who had primed his engine spilled gasoline so that when his motor backfired it caught fire. The fire followed the gasoline under the whole string of trucks. The drivers climbed out and ran. The fire alarm rang and our brigade of 16 men responded—tumbling over barbed wire fence with 1-quart carbon tetrachloride type extinguishers.

"In 20 minutes there was a cloud of black smoke 300 feet high, but the fire was out. In all 62 1-quart extinguishers had been used. The fleet was soon on its way 'up the line.'"

Third Prize—$2.00

C. K. MORAN,
Columbia Hose Co. No. 5, Carbondale, Pa.

Saves a Life and a Building

"Last December, while a hat cleaner was using naphtha to clean a hat, a spark from a motor in his shop ignited the naphtha vapor, causing quite a blaze.

"Just as a man passing by saw the predicament of the cleaner and was rushing in to help him, the cleaner threw the blazing naphtha and its container out the door. The man from the street was at once afire.

"In the meantime someone pulled an alarm box near by and our company responded. One of our members took a foam extinguisher and covered the burning man from head to foot and saved his life. The rest of the contents of the extinguisher was used on the small fire inside."

Honorable Mention

LESLIE W. HOWELL,
Fire Department, Islip, N. Y.

EARL L. JENSEN, Engineer,
Volunteer Fire Dept., Madelia, Minn.

CARL IRWIN,
Hose Co. No. 4, Harrisonburg, Va.

PUT your story of how an approved fire extinguisher of any make has been used to save life or property and get in line for an award next month for one of the cash prizes being offered in this contest coöperatively by the Pyrene Manufacturing Company of Newark, N. J., and VOLUNTEER FIREMEN. Until further notice the following cash prizes will be awarded each month: First Prize, $10.00; Second Prize, $3.00; Third Prize, $2.00. The contest will be judged by the engineering staff of the National Fire Protection Association and the editors of VOLUNTEER FIREMEN.

CONTEST RULES

1. Only members of a volunteer fire department may compete in the Pyrene Prize Letter Contest.
2. Letters are to describe actual experiences where any approved fire extinguisher of any make has saved lives or property.
3. Trade names may be used but will be deleted in publication. Publishers reserve the right to edit winning letters to permit publication.
4. Each contestant automatically vouches for the truth of the facts presented from his own or others' experiences.
5. Only one letter may be submitted each month.
6. Letters must be legibly written in ink or typewritten on white paper, one side only. Preference will be given to letters not over 250 words in length.
7. Letters received after the 20th of the month will be judged in following month's competition.
8. Monthly prizes in cash will be: 1st, $10.00; 2nd, $3.00, and 3rd, $2.00.
9. Address contest letter to Pyrene Prize Letter Contest, National Fire Protection Association, 60 Batterymarch Street, Boston, Mass.

Volunteer Firemen

Professional Journal of the Volunteer Firemen's Section of the National Fire Protection Association

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Volume 1 **July, 1934** Number 10

Friends of The Section The Volunteer Firemen's Section has a host of friends aside from the members of the Section. All those people interested in the welfare of volunteer fire service, such as state fire marshals, officers of paid fire departments, insurance inspectors and engineers, fire department instructors, and fire equipment manufacturers have helped us to spread the gospel of the Section to the volunteer firemen of the United States and Canada. We would like to list the names of these individuals and thus pay them public recognition, but space limitations will not permit. To them all, however, we extend our sincere thanks for their continued efforts in our behalf. We believe their real reward will come in the growing recognition of the importance and value of volunteer fire departments and in the development of a national and international spirit of coöperation among volunteer firemen that will exceed even the fine fraternal spirit that already exists between one volunteer fireman and another.

A Way to Keep Up Interest The companies and departments which have joined the Volunteer Firemen's Section to date have done so because of the interest of twenty or more of their members. A high type of individual enthusiasm obviously dominates these organizations. Their officers must have a relatively easy time of it.

In some departments it is a problem to maintain interest since the volunteer department must take its chances with all the other civic and social activities of the community. The Trustees, Commissioners or whatever the body governing the department may be called, and the Chief and line officers are all put to it to maintain the interest which is essential to a first rate department.

We believe that the Volunteer Firemen's Section can help these officers to stimulate and maintain that interest. By affiliating the department with the Section, VOLUNTEER FIREMEN can be provided each month to every member, bringing them the latest information on fire fighting and fire prevention. If the hundreds of letters we have received from member departments mean anything, VOLUNTEER FIREMEN is helping them in the doing of a craftsmanlike job for their community.

If you read this and are an officer or a member of the governing committee of the department, why not recommend an appropriation to cover the necessary dues for every member (50 cents per man, $10 minimum) and charge it up as a measure for the greater efficiency of the department?

Fire Schools This Summer This is just a reminder of the many fire schools which are being held this summer. A comprehensive account of the schools planned was given in the April issue.

Many departments are making arrangements to have a delegation attend the nearest school. If your department hasn't already done so, it certainly shouldn't lose the opportunity these schools present.

If you aren't familiar with what is planned in your territory, get in touch with the State Firemen's Association, Chiefs' Association, the State Fire Marshal's Office, the local insurance inspection department, State University or State Vocational Training Department. One or more of these agencies is coöperating and will know what program there is for you.

"The Volunteer"

(From THE SPECTATOR, *a leading insurance journal)*

"OUTDATING the republic itself, volunteer fire fighting has a record of unselfishness and self-sacrifice unmatched in the annals of our people. As an agency of public service its financial worth cannot be adequately appraised. No estimate can be made of property values saved by volunteer fire fighting organizations. The amount of money representing the difference between the losses paid by insurance companies and the amount which might have been paid were it not for volunteer firemen would run far in excess of billions of dollars. The added premium burden this would have occasioned is staggering to comprehend.

"There is a debt of gratitude due the volunteer firemen from the American public and particularly from the institution of insurance. Largely it cannot be repaid. To a degree credits are possible against the charge. Volunteer fire fighting is facing a crisis. The World War and millions of men in uniform made the youth of our day cynical. Glamour does not intrigue them. The machine age with its complications has aggravated the problem. The risk of loss to life or limb, endangerment of health, cannot be assumed in carefree vein. The men who stake their lives to serve a community must have their future and that of their dependents protected against untimely loss. It would seem a matter of concern to the insurance institution that adequate protection be afforded volunteer firemen by the municipalities they serve.

"Every effort should be undertaken to make their work an attractive duty. The aids which modern social progress have instituted for workers should be broadened to cover volunteer firemen. A campaign must be inaugurated to enlighten the public concerning its dependence on the work of these volunteer Americans. Workmen's compensation insurance for every fireman enrolled is an obvious obligation for which every municipality should be assessed."

Letters to the Editor

National Fire Protection Association,
Boston, Mass.

Gentlemen:

Regarding the magazine VOLUNTEER FIREMEN, please be advised that I am sounding its praises from the house tops and consider it is as interesting a little paper as I have found in a long while, not only to the volunteer firemen, but to the paid firemen as well. I personally have received a lot of valuable information from the paper.

Sincerely yours,

FRANK CHARLESWORTH, Chief,
Fire Department, Providence, R. I.

* * *

National Fire Protection Association,
Boston, Mass.

Dear Sirs:

Enclosed please find $10 and list of members. I think membership in the Volunteer Firemen's Section is a wonderful opportunity for volunteer firemen in small towns to keep up to date.

GEO. P. RYDER, Chief,
St. Stephen Fire Department,
New Brunswick, Canada.

* * *

National Fire Protection Association,
Boston, Mass.

It is with extreme pleasure that I send you our list of members, as I believe that VOLUNTEER FIREMEN will make us a better company.

Very sincerely yours,

HENRY B. KNICKERBOCKER, Chief,
Pine Plains Hose Company,
Pine Plains, N. Y.

* * *

National Fire Protection Association,
Boston, Mass.

Gentlemen:

I am enclosing herewith a list of the members of the Mediapolis Fire Company and ask that you kindly place these names on your Volunteer Firemen's section list.

In payment of our dues I am endorsing a check to you that we received from a local fire insurance association for services at a fire outside the town limits on which the insurance was carried in a Des Moines company. You will note on the check that the insurance company says "Thank you," so you see they do appreciate the service we gave and the fact that we undoubtedly saved them a much greater loss.

There are only ten members in our association, but our work has been very efficient. We are pleased to become members of the Volunteer Firemen's Association for the following year, and trust that we will receive valuable information during this connection.

Yours very truly,

A. A. JACKSON, Sec'y-Treasurer,
Mediapolis Fire Company,
Mediapolis, Iowa.

* * *

National Fire Protection Association,
Boston, Mass.

Gentlemen:

I enjoyed the convention in Atlantic City from beginning to end, as much, if not more than any convention I ever attended. The one section of the convention proper that appealed to me was the report and discussion with respect to the Volunteer Firemen's Section, and I came away from Atlantic City with the firm determination to second your efforts to develop the movement in Ontario.

The convention of our volunteer firemen's association is to be held at Ingersoll and a further convention of the Western Ontario association at Elora, Saturday, the 30th of June. I have promised to attend both conventions, and at that time it will please me very much to emphasize the splendid work that is being done in the organization of the new section of the N.F.P.A. and urge upon the delegates at the respective conventions the desirability of increasing the number of Ontario representatives.

If there is any other way in which you think I can second your efforts, let me know, for I came away from Atlantic City with the prime conviction that your work should be furthered to the fullest possible extent.

With best regards.

E. P. HEATON, Fire Marshal,
Province of Ontario,
Toronto, Ontario, Canada.

MEMBERSHIP PLAN

Volunteer Firemen's Section National Fire Protection Association

WHERE twenty or more firemen in a volunteer company or department affiliate with the Volunteer Firemen's Section the cost is 50 cents a year *per man*. Each fireman will receive one copy of VOLUNTEER FIREMEN, the monthly journal of the Volunteer Firemen's Section, mailed regularly to his home address. The company or department automatically becomes a member of the National Fire Protection Association and is entitled to full privileges of membership. All the literature regularly issued to N.F.P.A. members is mailed to headquarters of the company or department.

Membership may be applied for by one member of the company or department collecting 50 cents for each of the 20 or more members and making a single remittance for the group, or the company or department may take a membership for its men and make a single remittance from the company or department treasury.

Companies of Less Than Twenty

Because of the large amount of material mailed to members, not less than $10.00 can be accepted from any company or department for membership dues. In the case of companies or departments with less than twenty men this means that the cost divided among them will be slightly higher per man. Of course, some such companies or departments may prefer to make a single remittance of $10.00 from the company or department treasury. In other cases a few interested citizens, not members of the company or department, may be glad to contribute 50 cents apiece to make up the required minimum of twenty, so that the members may secure the rate of 50 cents per man.

These companies or departments have full privileges of N.F.P.A. membership as above and each member receives the monthly magazine, VOLUNTEER FIREMEN, at his home.

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The Kidde conversion consists of a cylinder of compressed carbon dioxide gas which is connected to the 40-gallon tank by means of small bore hose. To operate it, you open the valve on the conversion cylinder and discharge gas into the 40-gallon tank until the pressure gauge shows the pressure you want. Then, when you open the water valve, you will get a hose stream with better range than you ever had before.

To recharge, you simply fill the 40-gallon tank with water. One charge of gas in the conversion will empty a 40-gallon tank 4 to 6 times. A recharge for the conversion cylinder costs no more than one soda and acid charge. Conversions are available for both single or double tanks and can be easily installed by any mechanic.

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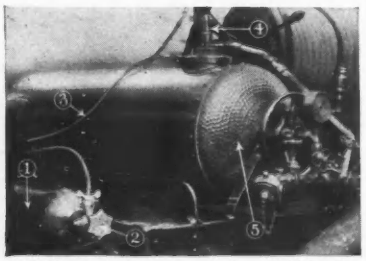

1. Kidde Conversion cylinder of gas. 2. Valve Controlling gas. 3. Hose connecting conversion and tank. 4. Safety valve. 5. Forty gallon tank.

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What to Look for at Arson Fires

By George O. Q. Mansfield, *Chief Fire Inspector, Massachusetts Department of Public Safety*

AS a fireman, you are on the job in the very first stages of a fire. You therefore have the best chance of obtaining data which will be very valuable later as evidence of incendiarism, if the fire proves to be suspicious. The suggestions given here are to indicate the features for which you should look, which will usually greatly help the man from the fire marshal's office, or the police, who has to investigate the fire for evidence of arson.

You are concerned also with the prevention of incendiary fires and the apprehension of persons attempting to set them. You may frequently receive information which leads to a suspicion that a person may be preparing to have a fire. You may even observe such things as a property owner entering his building at night carrying a gasoline or oil can; goods being removed, indicating that stock is being secretly depleted; or other similar instances of a suspicious nature. Even if the incident creates only slight suspicion, it should lead to further tactful inquiry, as for example, an inspection of the premises.

Making Inspections

Through inspections for fire hazards firemen may set up a deterrent to arson. The inspector should inquire as to the amount of insurance carried, and whether or not business is good. These inspections may be made of the premises under the guise of merely checking up for fire prevention reasons. If the person has been contemplating a fire, he will probably change his mind after firemen have visited him and made these inquiries. If the evidence is strong enough that a fire is going to be set, your fire officials should notify the police and state fire marshal's office at once so that a watch can immediately be placed on the building, and the perpetrator of the attempted crime may be captured in his attempt to set the fire.

When approaching a burning building you may observe indications which will lead you to suspect that the fire may be of incendiary origin. For instance, when heavy black smoke is coming from a building, you should be on the lookout for flammable liquids. In one case I have in mind, the firemen upon entering a burning bungalow found it had been thoroughly soaked with fuel oil. Another suspicious circumstance to be looked for is the presence of more than one fire. Or perhaps the shades have been drawn, or papers have been tacked up over the windows.

Such things should be fixed firmly in your mind; and it is well to call them to the attention of other firemen so that corroborative evidence may be had.

Corroborate Details

The next point is, was the building found secure? That is to say, were the doors locked, and did the firemen have to force an entrance? In many cases it is important to show that the building was locked, that the owner or occupant had the only keys in his possession and therefore that he had the exclusive opportunity to set the fire, or if the fire was set by someone else, that the fire maker must have secured a key from him. Consequently it is most important to remember just who forced the door. An officer of the fire department should remember whom he ordered to force an entry. The man who forces the entrance should remember that he did it under the orders and direction of a certain officer.

Now, having forced or otherwise gained an entrance, you may be greeted by certain odors, or certain types of smoke, or certain intensity of heat. It is important to remember these things. You should not depend solely upon your own senses, but should call things to the attention of other firemen, and secure samples of the burning liquids or other materials if possible.

Upon entering, more than one separate fire may be noted. Try to fix the locations of multiple blazes firmly in your mind, because the flames may spread so rapidly that separate fires will become joined and later appear as only one fire. If separate fires can be extinguished before they become joined, and without disturbing trailers, it is most important to do so, as evidence of multiple fires will be most damaging to the accused. Photographs of such evidence are also valuable. When trailers and fire traps are found, a fireman or police officer should be left on the premises after the fire is extinguished to see that no one disturbs the layouts until photographs are taken. If the perpetrator of the crime should arrive and find that trailers and fire traps have not been disturbed, he may attempt to get them out of the way to prevent their use as evidence.

Sometimes when a fire trap has been discovered which has not been burned, it may be possible to catch the culprit by a stratagem. Notify the owner or occupant of the building that he is wanted at the premises because there has been a slight fire. When he arrives have an officer hidden away in the building, and allow the suspect to enter. It may be that he will go directly to the fire trap to see if it has burned. If it hasn't, he is likely to try to get it out of the way. The officer may then immediately apprehend the suspect.

Many kinds of fire traps and trailers may be found. These will be mechanical and other contrivances all designed to do two things: to make sure that the fire gets a good start and that it quickly spreads throughout the premises. A very common device is a lighted candle set in flammable material, such as straw, hay, excelsior, oily rags and paper. Other devices include varied contrivances using such things as gasoline, fireworks and electric apparatus.

This is the first of a series of two articles by Mr. Mansfield, an experienced fire investigator. The accompanying material is a part of instruction notes he has prepared for the regional fire schools in Massachusetts, of which he is an instructor. The second article, "What to Do With Arson Evidence," will appear in an early issue.

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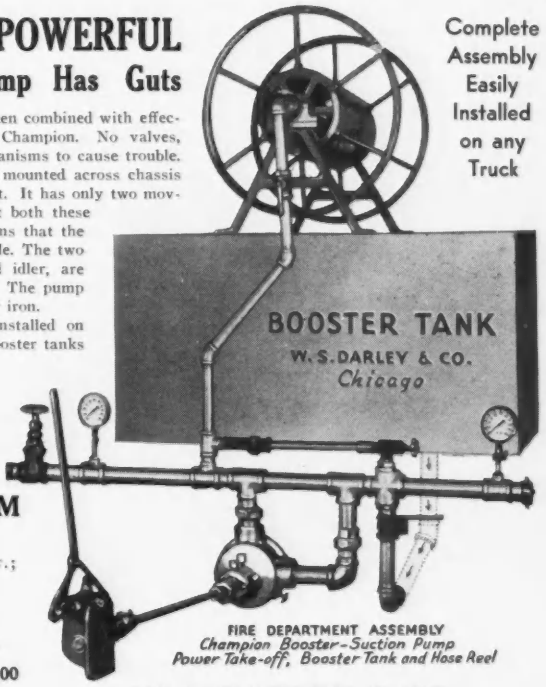

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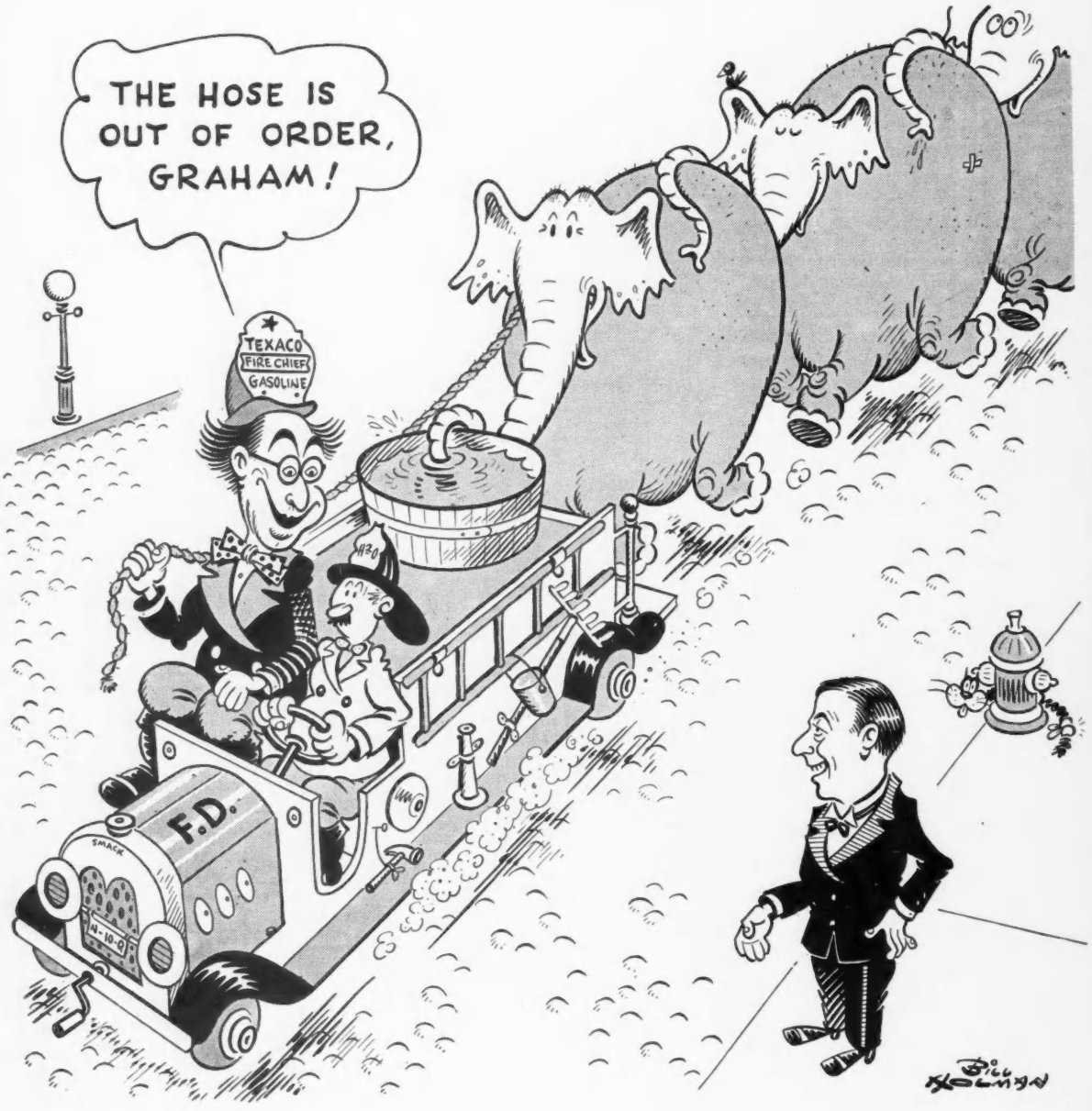

A copy of this cartoon, autographed by Ed Wynn, the Texaco Fire Chief, will be sent to you with the compliments of The Texas Company, makers of Texaco Fire-Chief Gasoline. Please address your request to The Texas Company, Room 1812, 135 East 42nd Street, New York, N. Y. Be sure to indicate the room number.

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